

## **Proactive Response to Radioactive Materials Management In Light of 9/11 – Weapons of Mass Disruption – A Perspective Based Misnomer?**

**By: M.W. Pearson, CHP**

The successful 9/11 terrorist attack in the United States has had both a direct and immediate effect on American lives and an associated immediate and as yet unidentified long term effect on the American way of life. The end result of the attack, in terms of both professional and regulatory response, is yet to be identified.

One immediate effect, however, is the realization that the previously identified health and safety concerns over orphan sources and lack of control of radioactive materials have now been elevated beyond mere consideration of health and safety issues. In a letter from Chairman Meserve, Nuclear Regulatory Commission (NRC), to Robert G. Card, Under Secretary for Energy, Science and Environment<sup>1</sup>, the NRC requested that the Department of Energy (DOE) “consider the acceleration of its recovery of unwanted radioactive materials through the Off-Site Source Recovery Program (OSRP) operated at the Los Alamos National Laboratory.”

- “NRC is conducting a risk-based evaluation vulnerabilities to terrorists threats involving NRC-licensed nuclear facilities and materials”
- “Our evaluation has concluded that the possession or storage of unwanted radioactive sealed sources with no disposal outlet presents a potential vulnerability” and
- “...we believe that the hazards associated with radioactive materials registered with the OSRP warrant additional actions to reduce the risk to public health and safety.”

The letter further states that the NRC understands that the recovery schedule (for known sources) might reasonably be compressed to 18 months.

The content of the letter clearly implies that the NRC considers the sources to constitute a vulnerability for terrorism, elevating health and safety concerns to a national security concern. In addition, it implies that it is asking the DOE to recover, under the agreements in the NRC/DOE Memorandum of Understanding (MOU)<sup>2</sup> concerning the management of sealed sources, all sealed sources currently registered with the OSR Project, within the next 18 months, as compared to the estimated 5 years anticipated under current project planning and anticipated funding levels. As of this writing, the DOE has not replied to the NRCs request, identifying how the agency intends to respond, as agreed upon in the referenced MOU.

Recognition that sealed sources are a threat to national or homeland security has been documented in numerous documents, with news reports or publications by CNN, ABC, CBS, Christian Science Monitor, New York Times, Forbes, and others. There are several common threads included in the majority of these communications.

- Use of dirty bombs as a terrorist weapon requires that the terrorist have access to radioactive materials
- Acquisition of radioactive materials with subsequent production of a nuclear device (Improvised Nuclear Devices) is unlikely
- Radioactive materials are readily available for the construction of a “dirty bomb” (NDD – nuclear dispersion device)

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<sup>1</sup> Letter, Richard A. Meserve, US NRC to The Honorable Robert G. Card, Under Secretary for Energy, Science and Environment, US Department of Energy, Jan 16, 2002

<sup>2</sup> Memorandum of Understanding Between the US Nuclear Regulatory Commission Office of Nuclear Material Safety and Safeguards and the US Department of Energy Office of Waste Management Concerning Management of Sealed Sources, June 18, 1999

- Large numbers of excess and unwanted sealed sources have been accumulating because disposal is not available, creating the potential stockpile for use as dispersion devices.
- Numerous sealed sources are known to be missing and existing controls are, in many cases, questionable or nonexistent
- Health effects of exposure to nuclear dispersion devices are communicated as minimal
- Psychological and economic effects of the use of nuclear dispersion devices could be enormous

Radioactive materials, in any form, can successfully be used as the contaminant in a dirty bomb. This paper concentrates on concerns associated with transuranic sealed sources, acknowledging their widespread availability, ease of acquisition and use, and the lack of strict accountability and control. The paper also acknowledges only the efforts of the Off- Site Source Recovery Project at Los Alamos National Laboratories, even though it is recognized that other agencies are currently involved in efforts to identify, locate and establish appropriate management controls over other sources and materials as well.

The authors do recognize the efforts of numerous organizations and agencies to achieve national goals of both reducing the probability for use of radioactive materials in terrorist attacks and in preparing both the public and varied response organizations for such an occurrence. These preparations include our lawmakers' investigation of pertinent issues. The Senate Committee on Foreign Relations<sup>3</sup> has held hearings that included testimony from Dr. Henry Kelly, Federation of American Scientists<sup>3</sup>, Dr. Donald D. Cobb and Dr. Siegfried Hecker of Los Alamos National Laboratory. Dr. Kelly's testimony focused on the potential impact of terrorist use of various radioactive materials in New York City. Recommendations provided to the Senate fell into three categories:

- Reduce opportunities for terrorists to obtain dangerous radioactive materials
- Install early warning systems to detect illicit movement of radioactive materials
- Minimize casualties and panic from any attack that does occur

Dr. Cobb's testimony<sup>4</sup>, encouraging that sealed source control measures be integrated into systems for controls of nuclear materials, acknowledged that implementation of previous recommendations for materials control have begun to be implemented since September 11, pointed out that:

**“...the pace remains slow and the scope of the effort is not yet broad enough to cover the spectrum of nuclear threats, including RDDs. This work needs to be expanded and accelerated now.”**

Additional testimony, before the same committee, by Dr. Siegfried Hecker, on April 23, 2002<sup>5</sup>, includes radioactive materials control as one of three initiatives essential to creation and implementation of a comprehensive international nuclear security initiative.

In summary, it appears that the nation is becoming aware of the threat, but what about addressing those actions required to reduce both the occurrence of and the impact of radiological terrorism. These efforts are exceedingly slow, and the actions taken have not, in the authors' opinions, yet been effective in reducing opportunities for use for radioactive materials in objects of mass disruption.

Similar to the need for radioactive materials as a common thread in most referenced documents and articles perused are statements to the effect that the impact on public health and safety from the use of radioactive materials in devices other than improvised nuclear devices would be minimal, with few casualties, yet with enormous public impact. While this is a reasonable statement, considering the range

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<sup>3</sup> Testimony of Dr. Henry Kelly, President, Federation of American Scientists before the Senate Committee on Foreign Relations, March 6, 2002

<sup>4</sup> Testimony of Donald D. Cobb, Associated Director for Threat Reduction, LANL, March 6, 2002, LA-UR-02-1165, Los Alamos National Laboratory, 2002

<sup>5</sup> Senate Committee on Foreign Relations Hearing on “Increasing our Nonproliferation Efforts in the Former Soviet Union”, Siegfried S. Hecker, Senior Fellow, Los Alamos National Laboratory, April 23, 2002

of assumptions thus far postulated, I invite you to consider the impacts associated with the scenario we recently developed.

The scenario<sup>6</sup> was developed as a result of an article published by Forbes, and shown on their web site on March 25, 2002.<sup>7</sup> In this article the author surmises about the use of programmed model airplanes, modified to become silent, unmanned aircraft, as a terrorist weapon. Well, after reading the article it did not require too much additional thought for our devious minds to explore the potential impacts on public health and safety if a delivery device of this nature were used at a culturally significant event in American society.

Scenarios, using delivery devices such as the aircraft discussed in the Forbes article and small quantities of radioactive materials; such as gram quantities of actinides extracted from commonly available well-logging or similar sources (over 5,000 are known to exist as excess and unwanted) were evaluated. The evaluations assume various methods by which the radioactive material could easily be carried aloft and subsequently dispersed at a densely populated location or public event.

The results, summarized for brevity, indicate, under varying conditions, the potential for CEDEs in the hundreds to thousands of REM, with thousands of people receiving greater than 25 REM CEDE. The potential for acute fatalities from these exposures is, in all likelihood, nil – however, the potential for cancers and intense and continuous medical care and monitoring is high? Would the results of a scenario such as this, especially if applied to multiple locations or using multiple delivery devices, be a success from a terrorist perspective? Could it easily be applied to other locations as well? Examples could include use of multiple aircraft on an unassuming, unsuspecting community or enhancement of common pyrotechnics at open air concerts.

Is there a need to perhaps change our perspective on the potential impacts on public health and safety from use of dispersal devices? Is there a need then to continue the pressure on ourselves, our regulators, and our government agencies to expeditiously implement plans and processes to place radioactive materials under the appropriate degree of control?

Ask yourself this question both in the conduct of your everyday in-house work and in your contact with your regulators and government. And remain aware that the “orphan nuclear stockpile” is real – it is for the most part readily available, and there is a potential for real damage.

Know also that progress is being made, awareness is high, pressures have been brought to bear to evaluate and to modify, as appropriate, existing methods of doing business.

And remember also that agencies are available to assist in reducing inventories of radioactive materials available for use. The Off-Site Source Recovery (OSR) Project at Los Alamos National Laboratory – charged with the management of actinide bearing sealed sources, has identified more than 5,000 actinide sources currently excess and unwanted, awaiting collection under the program. Progress has been made, more than 3,000 sources have been collected already. However, continued and accelerated recoveries are plagued with budget reductions, jurisdictional and security issues. Pressure must be maintained to ensure resolution of issues currently affecting this programs success. Other agencies and programs have been affected as well.

For sources eligible for recovery by the OSR Project – the numbers are great – the workload, in terms of the numbers of sources, consist primarily of americium sources. The majority of the activity is shared between americium and plutonium 238/beryllium sources. However, in addition to these, the project has identified approximately nine kilograms of plutonium 239 available in the excess, unwanted inventories.

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<sup>6</sup> Reducing the Orphan Nuclear Stockpile, L. E. Leonard and J. A. Tompkins, Off-Site Source Recovery Project, Los Alamos National Laboratory, LAUR-02-2169, Presented to the American Nuclear Society, April 2002, Santa Fe. New Mexico

<sup>7</sup> Way Under the Radar, Jef Raskin, Forbes, 03.25.02, [wysiwyg://9/http/www.forbes.com/asap/2002/0325](http://www.forbes.com/asap/2002/0325)

Visualize the potential acquisition and use of these sources in weapons – either those of mass disruption, or those of mass destruction. Information on these materials is readily available on the internet – both in terms of the types of materials in use, the types of industries and facilities at which they are used, and routes and methods by which materials are transported. A search for “radioactive material terrorism” on a popular internet site – revealed, on April 11, 2002 -7060 hits – all of which offer information useful to persons engaged in nefarious activities. On April 15<sup>th</sup>, the day I started writing this paper, that number had grown to 7840 hits, April 19<sup>th</sup> – 7970, and on May 6<sup>th</sup> – 8510. Does this constitute responses to an increase in public fears, more sensational journalism, or dedication of resources to activities other than the norm – all perhaps a sign that the terrorists are succeeding??

Are we done? Has the federal bureaucracy eliminated the existing inventory of radioactive materials available for use by terrorists? Has it implemented measures that remove the conditions that were responsible for creation of existing inventories? Does it need continued guidance and pressure to ensure that it acts responsibly, both in terms of the potential terrorist use of radioactive materials and to ensure public health and safety?

I leave you with the responsibility of answering the questions for yourself. Look around within your environment and identify existing hurdles to both establishing and maintaining present and future controls of radioactive materials. If removal of these hurdles is not within your control, then your communication of the continuing problem is still required. As health physicists and allied professionals, our continued involvement and encouragement is still needed, and we cannot afford to ignore our responsibilities. Prevention of insults on public health and safety, regardless of the method employed to incorporate radioactive materials or the anticipated exposures to the public – is our job.